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SPRAYING CALENDAR

BULLETIN No. 3, WASHINGTON EXPERIMENT STATION
PULLMAN—R. Kent Beatie, Botanist; A. L. Melander, Entomologist

This applies broadly to all parts of the Northwest, hence we print verbatim.—Toppenish Nursery Co.
There is no spraying that will cure everything. Use the ones that fit your case. For information about insect pests, plant diseases and spraying, write to the Botanist or Entomologist of the Experiment Station in your state.

When to Spray	What to Use	What to Spray For	Notes
FALL Just after the leaves fall. Especially for Western Washington.	Sulphur-lime 3° Beaume	Apple cankers. Scale insects. Eggs of green aphs and red spider. Pear leaf blister mite. Woolly aphs. Eggs of tent caterpillar. Moss and lichens. Rabbits and field mice.	This spraying may be preceded by a spraying of bordeaux as soon as crop is picked; for canker only. Write for bulletin on sulphur-lime spraying.
WINTER While buds are swelling. Usual spraying where there is no canker.	Sulphur-lime 3° Beaume	Bud moth; twig borer; peach-lear curl. Scale insects. Eggs of green aphs and red spider. Pear leaf blister mite. Woolly aphs. Rabbits and field mise. Mildew.	Too early spraying will miss these. Write for bulletin on sulphur-lime spraying.
SPRING (1) When flower buds are ready to open. (2) While last blossoms are falling.	Sulphur-lime Lead arsenate 1 lb. to 50 gallons Sulphur-lime 1.5° Beaume	Apple scab. New York apple canker. Prune brown rot or fruit mold. Codling moth. Bud moth; twig borer. Caterpillars. Apple scab. New York apple canker.	Spray when central flower of cluster is about to open. Use a bordeaux nozzle with a crook and spray with force from raised platform directly into every flower. Repeat immediately. If so applied, these sprayings are sufficient. Keep a few trees banded. If many worms are trapped, spray. Write for codling moth bulletin. Not advisable to mix with arsenate of lead. Omit if there is little scab.
SUMMER When the pest appears.	Tobacco (or kerosene emulsion) Lead arsenate Sulphur-lime 1.5° Beaume As a strong wash Bordeaux	Aphis (cherry aphis, etc.) Woolly aphis on branches. Red spider. Oyster shell bark louse. Leaf hopper. Pear and cherry slug. Caterpillars. Colorado potato beetle. Fruit spot (Baldwin spot; punk rot). Mildew. Red spider; young of oyster shell louse. Trunk borer; flat head borer. Flea beetles. Cutworms. Grasshoppers. Potato blight.	About June 15 for newly hatched young. Spray early before they acquire wings. Use 1 pound to 75 gallons. Or dust with lime, ashes or road dust. Use 1 pound to 40 gallons. Early in July. (Treatment in the experimental stage.) Keep trunk coated all summer; best to add excess lime. As a repellant. July 1 to 15; repeat in two weeks. If much blight near by, give third application two or three weeks later.

	What to Spray For	Notes
Pests controlled by other remedies than spraying	Pear blight (fire blight of pear and apple). Western tomato blight. Potato scab. Smut of wheat and oats. Root maggot of radish, turnip, cabbage, etc. Cabbage worms. Climbing cutworms. Garden cutworms. Woolly aphs on roots.	Prune out every sign of blight, cutting well below the disease. Swab every cut with corrosive sublimate (1 to 1,000 of water). Clean the tool often with carbolic acid, or you will spread the blight with each cut. Set out strong plants close together, or plant the seed thickly in the rows. Give best of care, shade and plenty of water. You will probably lessen the blight. Soak seed for two hours in formalin (1 lb. to 30 gallons of water), then cut and plant. Do not plant in soil where scabby potatoes were grown. Spray seed thoroughly with formalin (1 lb. to 45 gallons of water; cover and let lie in a pile two hours; dry and plant with a clean seeder. Spray soil with carbolated lime before maggots appear. Repeat often. Cultivate well after crop is removed. Place a 3-inch tarred paper collar on young cabbage plants. Paris green 1 part, bran 40 parts. Mix well. Dust the plants before worms eat in. Paris green 1 part, bran 40 parts. Make a mash by adding water. Season with a little molasses, stale beer or salt. Scatter by spoonfuls before planting or among plants. Expose the roots as much as practicable and spray with tobacco, kerosene emulsion or sulphur-lime. Root treatment is not completely reliable.
Fumigation for insects	For nursery stock, use 1 oz. cyanide to 100 cu. ft. For grafts and scions, use 2/3 oz. cyanide to 100 cu. ft.	To every ounce of pure potassium cyanide (poison) add 1 1/2 liquid ounces sulphuric acid diluted with 2 1/2 ounces water. The gas generated is extremely poisonous. Fumigate 30 to 45 minutes.

HOW TO SPRAY

Spray thoroughly. Direct your attention to the hardest places to reach. Cover every surface. Wet behind the buds. Reach the bottom of every crack. Fill the lower calyx cup. Do not try to economize on spray. For all orchard spraying use a high-pressure pump (at least 200 pounds). Use bordeaux nozzles only. Use an eight-foot spray rod. Have a crook to set the nozzles at an angle of 45 degrees. Spray from a tower if trees are beyond your reach.

SULPHUR-LIME

Sulphur 1 pound
Fresh stone lime..... 1/2 pound
Water 1/2 gallon

Slake the lime in the cooker. Add the sulphur and the water. Boil briskly till the sulphur is dissolved (about 45 minutes), stirring continuously and keeping the cooker covered. As it boils down keep adding water. When finished let settle. Use only the clear liquid, which may be stored if kept from the air. Prepared in this way, sulphur-lime should have a hydrometer reading of about 26 degrees, a little weaker than the factory-made product.

For use, any concentrated sulphur-lime may be diluted according to the following table:

HYDROMETER TEST OF CONCENTRATE		TO MAKE DILUTE SPRAY	
Beaume degrees	Specific gravity	Beaume, 3° Sp. gr. 1.02 1 lb. sulphur in 5 gals.	Beaume, 1.5° Sp. gr. 1.01 1 lb. sulphur in 10 gals.
34	1.302	1—14 water	1—28 water
32	1.279	13	26
30	1.259	12	24
28	1.236	11	22
26	1.215	10	20
24	1.196	9	18
20	1.158	7	14
16	1.122	6	11

CARBOLATED LIME

Lime 10 pounds
Water 50 gallons
Carbolic acid..... 1 pint or more

Slake the lime with a little water, add rest of the water and the carbolic acid.

ARSENATE OF LEAD

Arsenate of lead (poison)..... 1 pound
Water 50 gallons

For newly hatched insects it is not necessary to use it stronger. Mix well first with a small amount of water. Powdered arsenate of lead is about twice as strong as the paste. Do not use arsenate that settles quickly.

BORDEAUX

Bluestone 6 pounds
Good lime 4 pounds
Water 50 gallons

Dissolve the bluestone by suspending it in a sack in 25 gallons of water in a barrel. Slake the lime in another vessel, adding a little water slowly, and dilute to 25 gallons. Mix the two thoroughly. Even the best bordeaux may scorch in rainy weather.

For double strength bordeaux use twice as much bluestone and lime.

KEROSENE EMULSION

Kerosene 2 gallons
Whale-oil soap 1/2 pound
Water 1 gallon

Dissolve the soap in the water by boiling, and add the suds boiling hot to the kerosene, away from the fire. The mixture is then to be agitated violently, preferably by pumping it back on itself with a force pump. After four or five minutes the mixture suddenly becomes creamy in consistence. If well made, the cream will stand for a long time without free oil rising to the surface. Unless otherwise stated, use 1 gallon of the emulsion to 12 gallons of water in spraying. One quart soft soap or 1 pound laundry soap may be used instead of the whale-oil soap.

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PHOTOGRAPH OF OUR BLOCK OF YEARLING APPLE GRAFTS TAKEN SEPTEMBER 21, 1911

We Want You to Know About These Trees

There was not a finer block of apple trees grown in the West this past season, and the trees now coming on are going to be of the same high quality. Better growing weather than we are now having could not be asked for.

GUARANTEED TREES

Every tree we ship is guaranteed TRUE TO NAME. We exercise the greatest care in propagating our stock, but in case any error should be made, and a tree be delivered which proves untrue to name, we agree to replace the tree free, refund the original purchase price, or TOPWORK THE TREE WITH THE PROPER VARIETY. The expense of this latter operation is much greater than that of building the tree right in the first place, hence we could not make this guarantee were we not sure of our grounds. THIS IS A GUARANTEE THAT MEANS SOMETHING. Other nurseries will agree to replace the tree free, or refund the price paid, but nothing more. Can you afford to take chances with trees that are not guaranteed absolutely?

Our stock is propagated on home grown seedlings, grown on virgin soil, and is thoroughly inspected before being shipped. You are insured against getting stock infected with any form of disease or pest. Mr. J. S. Tyler, our deliveryman this spring at Vollmer, Idaho, says in his final report: "I had four other deliveries, and will state for your benefit that not a single tree was thrown out of your delivery by the inspector, while the other nurseries suffered a condemned list of from 10 to 25 per cent of the total delivery. The _____ Company was hit hard, as well as the _____ Company. Your stock was much the superior of any of them."

Because of our ideal fall weather—no rains to start a new growth—we are able to absolutely mature our trees. Thus they retain all their vitality and vigor, are absolutely hardy, and will withstand the severest weather conditions. This is one of the chief reasons for the superiority of our stock over that grown in the rainy sections.

Finally, our methods of shipping and packing are of vital importance to you. We pack shipments in paper lined boxes, with the roots thoroughly embedded in damp shingle tow. Thus the trees are delivered to you in perfect condition. Mr. H. W. Stein, deliveryman for us last fall at Burley, Washington, says in this connection: "Your trees have given universal satisfaction, and in one thing in particular your nursery has received praise, and that is in the most careful packing of the trees and plants. This feature has shown out in marked contrast to the work of other nurseries."

Our Former Customers Are More Than Satisfied

The following quotations are taken from letters we have received this spring from satisfied customers. There are many more like these, which we have not space to include:

A. J. Koreski, Kennewick, Washington—"I am very much pleased with your nursery stock, and hope to do more business with your nursery in the near future."

W. H. Rock, Lo Lo, Montana—"Your shipment of nursery stock arrived today in good condition. The trees look fine. Are as good looking a lot of trees as we have had."

W. A. Hodges, Carey, Idaho—"I have seen the trees shipped by you for this territory, and think them the finest I ever saw. Everybody that sees them says the same."

Clemm Bratt, Fairfield, Washington—"They were a fine bunch of trees. They were the best I ever saw, comparing them altogether."

TOPPENISH NURSERY COMPANY, Toppenish, Washington

SAVE THIS CIRCULAR. The spraying calendar on the reverse side will be of permanent value to you.